HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Grovers Creek Hatchery and Satellite Rearing Ponds
Species or Hatchery Stock:	Fall Chinook
Agency/Operator:	Suquamish Tribe
Watershed and Region:	East Kitsap (WRIA 15, Mgmt Area 10E)
Date Submitted:	July 5, 2000
Date Last Updated:	July 5, 2000

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program. Grovers Creek Hatchery Fall Chinook Program.

1.2) Species and population (or stock) under propagation, and ESA status. Fall Chinook, *Onchorynchus tshawytscha,* Grovers Creek (Green River lineage) stock. Grovers and Gorst Creeks listed by NMFS (list Federal Registrar reference) as not essential to recovery for the Puget Sound ESU. Same designation should apply to Dogfish and Clear Creeks as they are a components of the same Tribal program.

1.3) Responsible organization and individuals

Name (and title): Paul Dorn, Salmon Recovery Coordinator and
Salmon Enhancement Program Manager
Agency or Tribe: Suquamish Tribe
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program: WDFW (source of broodstock, cooperative partner), NWIFC (fish health inspections, coded wire tag program, funding assistance), local sports clubs (volunteer feeding, setup, etc.).

1.4) Funding source, staffing level, and annual hatchery program operational costs.
BIA, Congressional Appropriation, Tribe, WDFW (fish food). Six full time staff (also used for coho and chum programs) and two seasonal part-time staff. Total chinook program direct cost: $378,000.00. Over 100 part time volunteers (perform almost all satellite rearing ponds feeding, over half the setup, repairs, takedown, and cleanup) and NWIFC (cwt, fish health, support) contribute services valued over $200,000 annually.

1.5) Location(s) of hatchery and associated facilities.
Grovers Creek Hatchery = 0.1 rk Grovers Creek, WRIA 15.0299, E. Kitsap, WA.
Websters Rearing Pond = 0.8 rk Dogfish Creek, WRIA 15.0285, E. Kitsap, WA.
Clear Creek Rearing Pond = 1.4 rk Clear Creek, WRIA 15.0249, E. Kitsap, WA.
Gorst Creek Rearing Ponds = 0.0 rk Gorst Creek, WRIA 15.0216, E. Kitsap, WA.

1.6) Type of program. Isolated Harvest.

1.7) Purpose (Goal) of program. Mitigation. The goal of the Suquamish Tribe's fall chinook program is to restore and maintain Tribal Treaty chinook fisheries in Area 10E.

1.8) Justification for the program. The Suquamish program will:
A. (1.8.1.) Provide fall chinook salmon for tribal, subsistence and ceremonial, commercial, and sport fisheries that can be harvested in an isolated terminal area.

B. (1.8.2.) Minimize adverse fishery selection pressures upon the population age composition, size characteristics, and run timing distribution over time.
C. (1.8.3.) Minimize adverse ecological and behavioral interactions upon listed stocks of Puget Sound fall chinook salmon and local wild stocks.

1.9) List of program "Performance Standards". The Suquamish Program will:
A. (1.9.1.) Utilize Grovers Creek Hatchery to spawn over 2,000 adults for 3.2 million eggs to produce the following: 500,000 zero age Grovers smolts; 2.1 million zero age Gorst smolts plus 100,000 yearling Gorst smolts; 150,000 zero age Dogfish smolts (increase planned for another 500,000 zero age smolts) plus 50,000 yearling Dogfish smolts; and 50,000 zero age Clear Creek smolts; all released into Area 10E. The Tribe retains the ability to harvest additional eggs to cover WDFW requests.
B. (1.9.2.) Harvest all broodstock from Grovers Creek Hatchery stock. No directed terminal harvest occurs on this run. All terminal fishery harvests are targeted on the satellite rearing pond releases.
C. (1.9.3.) Isolate the hatchery chinook program from streams with wild chinook salmon populations and rear the hatchery chinook to maximize homing and minimize straying from Area 10E.

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

1.10.1) "Performance Indicators" addressing benefits.
A. (1.10.1.1.) The Grovers Creek broodstock return remains above 2,000 adults, the rate of fertilization above 80%, and the survival from eyed egg to smolt above 80%.
B. (1.10.1.2.) The Grovers Creek Hatchery run remains 99% Grovers Creek stock, i.e. strays from the satellite ponds, other hatcheries, and wild populations remain less than 1% of the Grovers adult spawning population. The Tribal, commercial, and sport terminal fishery has an opportunity to harvest more than 10,000 hatchery-only adult salmon without catching wild chinook.
C. (1.10.1.3.) Demonstrate that 99.9% of fall chinook spawning in local streams are hatchery fish, returns from the rearing ponds that escaped the terminal fisheries. Gorst Creek has the largest population of hatchery spawners. If these fish are only Hatchery Origin Recruits (HORs), the ecological benefits include: gravel cleaning services by the spawning chinook (for wild Gorst chum, cutthroat, steelhead, and naturally spawning coho); the use of "loose" chinook eggs as an instream, energy-rich food source for juvenile salmonids, sculpins, and other opportunistic species; the use of live and/or dead adult chinook as food by Gorst watershed bear, cougar, bobcat, river otter, osprey, eagle, and other pisivorous-dependent species; the marine nutrients dispersed through the riparian vegetation and into the watershed via the predator vector; the consumption of emergent chinook fry as an instream food prey for the wild Gorst cutthroat, steelhead, and naturally spawned coho fingerlings. An ecologically-related benefit is the public education absorbed by more than 5,000 local residents of all ages descending on Gorst park for two weekends each September to observe, in awe, the spectacle of salmon completing one of natures most arduous life histories. (Bremerton Mayor Lynn Horton: "Never, in all my public career, have I been deluged by such an enormous, positive,

spontaneous response from our citizens as with their reaction to the return of the Gorst chinook salmon" – 1998). Grovers Creek Hatchery experiences a similar response from the local schools, local residents, and local media – an opportunity seized by Tribal staff to emphasize the importance of recovering wild chinook populations, ideally to the point of putting hatcheries out of business, or operating hatcheries consistent with attempts to duplicate natural runs and not interfer with recovery of wild runs.

1.10.2) "Performance Indicators" addressing risks.
A. (1.10.2.1.) The Grovers Creek broodstock return trend falls below 2000 adult spawners, the egg fertilization rate drops below 80%, or eyed egg to smolt survival drops below 80 %.
B. (1.10.2.2.) The proportion of Grovers Creek hatchery spawners drops below 99% i.e. the proportion of strays from the rearing ponds, other hatcheries, or wild runs increases above 1 % of the population. The Tribal, commercial, and sport terminal fisheries opportunity to harvest hatchery chinook salmon drops below 10,000 adults, and/or wild chinook are intercepted in these fisheries.
C. (1.10.2.3.) Demonstrate that Natural Origin Recruits (NORs) are present with the HORs returning to local streams. The ecological risk would be to continue operating the hatchery program without attempting to recover the NORs.

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish). The entire Grovers Creek Hatchery run is utilized to collect broodstock most years. The number of returning adults averages 2,400 but can range up to 6,400 adults. The hatchery attempts to spawn all adults, keeping a proportion of each egg take, relative to the entire run, to maximize genetic diversity.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. Note: in the upper part of the table below, the Tribe provides surplus eggs for occasional WDFW program shortfalls in South Puget Sound.

Life Stage	Release Location	Annual Release Level
Eyed Eggs	Determined by WDFW	varies
Unfed Fry	N/A	0
Fry	Determined by WDFW	varies
Fingerling	Grovers Creek Hatchery	500,000/year
	Websters Rearing Ponds	100,000/yr; planned: 650,000
	Clear Creek Rearing Ponds	50,000/yr
	Gorst Creek Rearing Ponds	2,100,000/yr

Life Stage	Release Location	Annual Release Level
Yearling	Websters Rearing Channel	50,000/yr
	Gorst Creek Rearing Ponds	100,000/yr

1.11) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.
Grovers Creek Hatchery estimated smolt-to-adult survival rate is 1%, the satellite rearing ponds average 0.5%. Please refer to attached paper "Grovers Creek Hatchery Fall Chinook: Rearing History, Fish Health, Coded Wire Tag Study Results, and Observed Adult Size Trends" presented at the 48th Annual Pacific Northwest Fish Culture Conference, December 2, 1997. This paper is being updated in 2000 to accommodate NMFS's request for additional data. Grovers Creek Hatchery adult chinook returns are detailed in the following tables:

Year	# Jacks	# Males	# Females	Total
1981	2	87	110	199
1982	318	707	724	1,749
1983	1,675	582	748	3,005
1984	197	3,075	2,463	5,735
1985	167	907	1,460	2,534
1986	134	1,034	831	1,999
1987	161	1,180	932	2,273
1988	175	1,107	1,015	2,297
1989	47	1,336	1,098	2,481
1990	10	492	666	1,168
1991	88	236	266	590
1992	87	106	61	254
1993	137	701	266	1,104
1994	726	607	701	2,034
1995	918	3,687	1,660	6,265
1996	405	3,071	2,962	6,438
1997	94	1,612	1,330	3,036
1998	625	1,100	1,190	2,915
1999	380	2,693	1,570	4,643
			Total return to date:	**46,076**
			Average annual return:	**2,425**

Year	Grovers Releases	Grovers Returns	Gorst Releases	Gorst Escapement	Gorst Tribal Harvest	Total Releases
1976						0
1977						0
1978						0
1979	205,673					206,700
1980	289,517					289,500
1981	340,728	199				340,728
1982	489,965	1,749	52,400			542,356
1983	520,800	3,005	80,000			600,800
1984	594,000	5,735	690,000	174		1,284,000
1985	606,500	2,534	967,000	292		1,904,458
1986	637,032	1,999	970,000	410		1,906,954
1987	547,353	2,273	500,000	637	7,563	1,253,656
1988	531,351	2,297	2,320,000	325	8,633	3,150,300
1989	380,239	2,481	2,219,386	268	8,600	2,910,341
1990	501,391	1,168	2,350,520	707	7,410	3,102,329
1991	580,288	590	2,238,661	311	4,323	3,141,610
1992	509,815	254	200,000	172	3,097	862,693
1993	493,457	1,104	1,800,000	150	2,000	2,172,549
1994	268,873	2,034				670,480
1995	492,967	6,265				2,463,440
1996	563,320	6,438				2,505,964
1997	590,949	3,036				2,706,576
1998	508,565	2,915				2,703,674
1999	579,481	4,643				4,775,818
2000		3,000				4,000,000
Total	10232264	53,719				43,494,926

Program goals are: Grovers Creek Hatchery - 500,000 fingerlings annually
Webster's Rearing Pond - 175,000 fingerlings annually
Webster's Rearing Pond - 50,000 yearlings annually
Clear Creek Rearing Pond - 50,000 fingerlings annually
Gorst Creek Rearing Ponds - 2,100,000 fingerlings annually
Gorst Creek Rearing Ponds - 150,000 yearlings annually

1.13) Date program started (years in operation), or is expected to start. The Tribe's Grovers Creek Hatchery program started in 1978 and has operated continuously.

1.14) Expected duration of program. The program is planned to last indefinitely, or until

Puget Sound wild chinook can sustain Treaty fisheries.

1.15) Watersheds targeted by program. There are four East Kitsap watersheds targeted by the Suquamish Tribe's program: Grovers Creek (WRIA 15.0299); Dogfish Creek (WRIA 15.0285); Clear Creek (WRIA 15.0249); and Gorst Creek (WRIA 15.0216)

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed. The Tribe considered waiting for recovery of Puget Sound chinook but decided it could be a long wait.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program. Grovers Creek Hatchery was constructed with a Biological Assessment (Mitigated Declaration of Nonsignificance) under NEPA, groundwater rights were obtained through Department of Ecology (for 500 gpm), the founding broodstock was obtained through WDFW's salmon culture program permitting process and the Tribes and WDFW worked out a South Sound Fall Chinook Comanagement Agreement to set production levels, expected harvest levels, and required escapement. The Tribe follows the State-Tribal Fish Health Plan, Future Brood Document, and its own internal Hatchery Operations Guidelines.

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.
Not Applicable during freshwater phase – the Tribal program's fall chinook have been determined by NMFS as within the esu, but not essential to recovery of the ESU. The Tribe maintains a hatchery database including adult age class structure, adult sex ratio, individual adult length and weight, run migration timing and daily adult return numbers, and smolt volitional outmigration timing. There is no conflict within Area 10E freshwater streams that requires spatial or temporal run timing to differentiate hatchery chinook from wild chinook. Marine research studies will be necessary to differentiate presence/absence of wild chinook to determine interaction(s) (if any) with Grovers Hatchery program.

- Identify the ESA-listed population(s) that will be directly affected by the program.
None (Federal Register reference).

-Identify the ESA-listed population(s) that may be incidentally affected by the program. Listed Puget Sound fall chinook are not present in East Kitsap's freshwater streams, but are assumed to be present in East Kitsap marine waters as outmigrating fingerlings, blackmouth, and/or as returning migrating adult salmon. It is also possible listed chinook may show up as strays in East Kitsap freshwater streams, including Grovers Creek Hatchery spawning rack.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds. Not applicable.

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data. Not applicable.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data. No chinook salmon are passed above Grovers Creek Hatchery due to lack of spawning habitat. The Grovers Creek Hatchery satellite rearing ponds have chinook salmon that pass through the terminal fisheries and spawn in the lower stream segments of Dogfish, Clear, and Gorst Creeks. These adult chinook are enumerated by the Tribe's stream surveyors weekly, with the total escapement reconstructed by run size estimation calculation. No chinook habitat seeding, by eyed egg plants, unfed fry, fed fry, or any other method, is done by the Grovers Creek fall chinook program. WDFW's Minter Creek Hatchery had an extensive out-planting program using fall chinook fed fry and smolts planted in most major East Kitsap drainages from the late 1930's through the mid 1970's. (data source: Minter Creek Hatchery archived records reviewed by Paul Dorn, 1977).

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known. NOR adult fall chinook have not been observed in East Kitsap streams. HOR adult fall chinook are enumerated in the following table:

Will provide a table enumerating observed HOR escapement into all East Kitsap streams for the last 20 years by September 30, 2000. Started this table in Section 1.11 above, but haven't had time to complete the table for all streams.

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take. None known at this time. Possible interactions include future take of stray NOR's at Grovers Creek Hatchery rack, and also future, planned, East Kitsap hatchery research projects designed to evaluate if NOR's are present in East Kitsap marine waters and what, if any, interactions occur with the hatchery HOR's.

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take. None known at this time. Grovers Creek Hatchery has a low potential to take listed species at the

hatchery rack (Tribal hatchery database). Terminal fisheries and East Kitsap stream escapements have a low potential to take listed species (Tribal management database).

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish. No take known to have occurred.

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).
Not applicable at this time.
*Complete the appended "take table" (**Table 1**) for this purpose. Provide a range of potential take numbers to account for alternate or "worst case" scenarios.*

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program. Not applicable at this time.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.
The Grovers Creek Hatchery fall chinook program is listed in the WDFW Future Brood Document and South Sound Tribal/WDFW hatchery chinook production agreement. Both in the process of being adjusted to recovery of listed ESU species.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates. This HGMP is consistent U.S. vs Washington, WDFW-Tribal South Sound Allocation Agreement.

3.3) Relationship to harvest objectives. This HGMP is consistent with WDFW-Tribal harvest management plans approved by NMFS for the 2000 harvest season.

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available. A number of Alaskan, Canadian, and Washington Treaty, commercial, and sport fisheries benefit from this program (reference attached NWFCC conference paper and CWT database reports). Impact on listed species to be determined by WDFW-Tribal management programs.

3.3) Relationship to habitat protection and recovery strategies. None. The Grovers Creek Hatchery program is designed for mitigation: isolated harvest only. The Tribe's coho, chum, and salmon recovery program are designed to protect and restore salmonid habitat throughout East Kitsap. The Tribe's program will benefit all species.

3.5) Ecological interactions. See Sections 1.10.1.1. through 1.10.1.3 above.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source. Grovers Creek Hatchery uses a combination of well and spring water for incubation and a combination of well and surface (Grovers Creek and a tributary) for rearing. Detailed water quality data will be attached to this HGMP in September, 2000. Grovers Creek Hatchery operations are well below NPDES permit thresholds. The Tribe follows screening criteria specified by NMFS and WDFW guidelines.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge. Not applicable.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods). An instream dam on Grovers Creek diverts all water through a recapture pond. Returning adult hatchery chinook ascend into the pond via a fish ladder. Hand pulled seines are used to round up the salmon.

5.2) Fish transportation equipment (description of pen, tank truck, or container used). A 1-ton flatbed with a 500 gallon compartmentalized fiberglas tank is used to transport the small numbers of adults that are stranded intertidally downstream of the hatchery.

5.3) Broodstock holding and spawning facilities. A 29,000 cubic foot earthen recapture pond is used to hold returning adults. A 12 x 24 foot adjacent spawning shed is used to spawn the returning hatchery adult chinook.

5.4) Incubation facilities. A combination of FAL (Heath-style) incubators and deep matrix incubators are used to eye up the eggs. WDFW hatcheries are used to incubate the Gorst fall chinook eggs due to lack of water and space to hatch all program egg requirements.

5.5) Rearing facilities. A 10,000 cubic foot concrete pond at Grovers Creek was constructed to rear 200,000 Grovers Creek chinook for CWT, after which all salmon are reared in the 29,000 cubic foot earthen pond used to recapture the adults.

5.6) Acclimation/release facilities. Grovers Creek: 29,000 cu ft pond; Dogfish Creek: 29,000 cu ft pond (one planned 30,000 cu ft earthen rearing channel); Clear Creek:

10,000 cu ft pond; Gorst Creek: two 100,000 cu ft earthen ponds, two 75,000 cu ft raceways for yearling production.

5.7) Describe operational difficulties or disasters that led to significant fish mortality. A burst beaver dam on a tributary to Gorst Creek killed 500,000 chinook in 1987. A clogged intake at Gorst Creek killed 1.8 million chinook in 1992. Gorst is operated with volunteers during the day and no one on station at night. This facility is expected to experience higher mortality due to lack of funding for permanent staff. The motto has been, "if we don't try, we won't have any chinook to harvest".

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality. Not applicable to listed species.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source. Grovers Creek Hatchery chinook were founded on historical Green River stock: brood year 78 = Finch Creek; brood year 79 = Green River; brood years 80, 81 = Deschutes stock. All subsequent brood years were spawned Grovers Creek stock.

6.2) Supporting information.

6.2.1) History. Grovers Creek Hatchery chinook were founded on historical Green River stock: brood year 78 = Finch Creek; brood year 79 = Green River; brood years 80, 81 = Deschutes stock. All subsequent brood years were spawned Grovers Creek stock.

6.2.2) Annual size. No NOR's are collected at this facility.

6.2.3) Past and proposed level of natural fish in broodstock. None.

6.2.4) Genetic or ecological differences. Not applicable: no ESU stocks present.

6.2.5) Reasons for choosing. A Puget Sound chinook broodstock was selected, and is being managed by the Tribe to create an East Kitsap broodstock.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices. The Tribe's chinook hatchery program was isolated from natural stocks to eliminate genetic or ecological interactions.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles). The Tribe collects

gametes from hatchery chinook returning to Grovers Creek only. Gorst Creek facilities were designed to harvest adults should state shortfalls be anticipated. The Tribe would cut back, or eliminate terminal fisheries to allow Gorst escapement under this scenario.

7.2) Collection or sampling design. 100% of adult broodstock returning to Grovers Creek are harvested from the Hatchery's adult recapture pond from mid September until the end of the run in early November each year.

7.3) Identity. Grovers Creek hatchery fall chinook are the only chinook that return to East Kitsap. These hatchery chinook are identified by CWT. Brood 2000 chinook and beyond will also be mass marked.

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults): 2,000, or more, adults each year. A proportion of early, surplus eggs are discarded to maintain gametes collected based on the normal distribution of the run.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available: Grovers Creek data is as follows:

Year	# Jacks	# Males	# Females	Total
1981	2	87	110	199
1982	318	707	724	1,749
1983	1,675	582	748	3,005
1984	197	3,075	2,463	5,735
1985	167	907	1,460	2,534
1986	134	1,034	831	1,999
1987	161	1,180	932	2,273
1988	175	1,107	1,015	2,297
1989	47	1,336	1,098	2,481
1990	10	492	666	1,168
1991	88	236	266	590
1992	87	106	61	254
1993	137	701	266	1,104
1994	726	607	701	2,034
1995	918	3,687	1,660	6,265
1996	405	3,071	2,962	6,438
1997	94	1,612	1,330	3,036
1998	625	1,100	1,190	2,915
1999	380	2,693	1,570	4,643

Total return to date:	**46,076**
Average annual return:	**2,425**

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs. No hatchery chinook are released upstream. All hatchery chinook are the property of the Tribe and are distributed to Tribal Member's smokehouses.

7.6) Fish transportation and holding methods. Adults are spawned at Grovers Creek Hatchery. Gorst eggs are transferred to WDFW facilities for incubation and transferred to Gorst as fry via the Tribe's one ton truck. Grovers fish are reared on station. Dogfish and Clear Creek's fall chinook are transferred as fry in the one ton truck. All truck transfers take less than 30 minutes, no ice, antibiotics, anesthetics, anti-foam, or salves are used during transport.

7.7) Describe fish health maintenance and sanitation procedures applied. Fish health is monitored by qualified NWIFC fish health staff and on station personnel on a routine basis. Mortalities are removed on a daily basis. Earth ponds are treated with a soil bacterial commercial mix when water temperatures attain 10 degrees centigrade.

7.8) Disposition of carcasses. Carcasses are distributed to Tribal smokehouses.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program. No risk is posed to listed natural fish. The risk of fish disease amplification to all other East Kitsap hatchery or natural salmonid species is minimized by following the Co-manager Fish Health Policy sanitation and fish health maintenance and monitoring guidelines.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method. Spawners are chosen randomly over the whole Grovers Creek Hatchery run. HOR's are the only salmon present at Grovers Creek.

8.2) Males. One backup male is used for one on one spawning. Jacks are used on less than than 10% of the time, and only when more than 10 jacks are present during spawning.

8.3) Fertilization. The salmon are spawned with equal sex ratios 1:1: sperm from one male is deposited in the bottom of a small bucket, eggs from one female are introduced, then sperm from a second random male, and eggs from a second female. Creek water is then introduced for 10 seconds with gentle egg mixing by hand, the eggs are rinsed, enumerated volumetrically, and deposited into an iodophore solution for water hardening before transfer into the incubators. NWIFC personnel perform a complete viral and pathogen certification procedure and full reporting.

8.4) Cryopreserved gametes. None used except for Dr. Jeff Hard's NMFS genetics experiment.

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme. Not applicable.

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding. Data ompiled using Pondmanager computer software. Will be summarized by September, 2000.

9.1.2) Cause for, and disposition of surplus egg takes. The Tribe generally spawns an additional 100,000 eggs as a safeguard against potential incubation losses and/or for small research experiments on station. Eyed eggs, or fry, from these surpluses are donated to local landowners who have farm ponds with no outlet.

9.1.3) Loading densities applied during incubation. Please refer to Pondmanager data. The Tribe follows standard incubation flows and densities.

9.1.4) Incubation conditions. The incubators use groundwater, so temperatures range from 10 to 10.5 degrees centigrade. DO's are monitored daily, by stack, to insure they don't drop below 7 mg/l. Gas supersaturation is checked before the spawning season and monthly thereafter. A substrate is used in all Tribal incubators to provide more natural gravel-like conditions.

9.1.5) Ponding. Please refer to Pondmanager data. Fry are ponded manually before full Buttonup to avoid pinhead problems and fed a start-up diet immediately upon ponding.

9.1.6) Fish health maintenance and monitoring. A standard formalin drip treatment is applied three times weekly until the eggs hatch, when the treatment is discontinued. The eggs are picked and enumerated electronically at eye-up.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.
Not applicable.

9.2) <u>Rearing</u>:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available. Data will be summarized by Pondmanager printouts by September, 2000.

9.2.2) Density and loading criteria (goals and actual levels). Density does not exceed standard hatchery criteria: 0.1lbs fish/gpm and 0.5 lbs fish/1.0 cubic foot of rearing volume.

9.2.3) Fish rearing conditions. Standard monitoring protocols for temperature, DO, ammonia, and nitrite are followed. The hatchery chinook are reared in earthen ponds to simulate natural conditions. An application of soil bacteria twice weekly consumes unfed fish food and fish waste and eliminates the need to stress fish by pond vacuuming.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available. It's available from our hatchery Pondmanager database, but not reproduced here.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available. It's available from our hatchery Pondmanager database, but not reproduced here.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing. This information is available from our hatchery database but not summarized here due to lack of time to compile all the years different food types. The Tribe follows manufacturers guidelines and achieves 1.1 to 1.2 pounds of food fed to 1.0 pound of fish gained. The earthen ponds provide some supplemental natural food.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures. The Each year, fish pathologists screen a representative number of adults returning to tribal hatcheries for pathogens that may be transmitted to the progeny. The exact number of fish to be tested from each stock is specified in the Co-managers Salmonid Control Policy. Pathologists work with hatchery crews to help avoid pre-spawning mortality of broodfish to maximize fertilization and egg survival.

Preventative care is also promoted through routine juvenile fish health monitoring. Pathologists conduct fish health exams at each of the tribal hatcheries on a monthly basis from the time of juveniles swim-up until they are released as smolts. Monthly monitoring exams include an evaluation of rearing conditions as well as lethal sampling of small numbers of juvenile fish to assess

the health status of the population and to detect pathogens of concern. Results are reported to hatchery managers along with any recommendations for improving or maintaining fish health. Vaccine produced by the TFHP may be used when appropriate to prevent the onset of two bacterial diseases (vibriosis or enteric redmouth disease). In the event of disease epizootics or elevated mortality in a stock, fish pathologists are available to diagnose problems and provide treatment recommendations. Pathologists work with hatchery crews to ensure the proper use of drugs and chemicals for treatment. The entire health history for each hatchery stock is maintained in a relational database called AquaDoc. (Northwest Indian Fisheries Commission Fish Pathology pers.comm.)

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable. Not applicable.

9.2.9) Indicate the use of "natural" rearing methods as applied in the program. Earthen ponds are used and volitional outmigration used for release.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation. Not applicable.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

Volitional releases are followed: outmigrant barrier screens are removed when the zero fall chinook achieve the size of 90 fish/lb.

10.1) Proposed fish release levels.

Program goals are: Grovers Creek Hatchery - 500,000 fingerlings annually
Webster's Rearing Pond - 175,000 fingerlings annually
Webster's Rearing Pond - 50,000 yearlings annually
Clear Creek Rearing Pond - 50,000 fingerlings annually
Gorst Creek Rearing Ponds - 2,100,000 fingerlings annually
Gorst Creek Rearing Ponds - 150,000 yearlings annually

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse: From hatchery ponds in WRIA 15
Release point: see Sections 1.5 and 1.15
Major watershed: East Kitsap
Basin or Region: Puget Sound

10.3) Actual numbers and sizes of fish released by age class through the program.

Grovers Creek Releases:

Brood Year	Release Year	Total Smolts	Size	Total Fry	Size	Notes @ Release	Expected Survival to Seawater	Stock	C.W.T. #	CWT/Ad . Release	AD Clip no C.W.T.	UnMarked Release
1978	1979			20,000	900	Screen damage	10%	Finch Creek				
cont.	cont.			75,592	176	Flood damage	80%	Finch Creek				
cont.	cont.			96,444	120	Healthy	95%	Finch Creek				
cont.	cont.	8,621	96			Healthy	100%	Finch Creek				
cont.	cont.	5,016	40			Healthy	100%	Finch Creek				
1979	1980	289,517	71.4			Healthy	100%	Green River				
1980	1981	122,034	56			Healthy	100%	Deschutes				
cont.	cont.			75,571	288	Early release	67%	Deschutes				
cont.	cont.			50,460	208	Early release	75%	Deschutes				
cont.	cont.			45,075	144	Early release	90%	Deschutes				
cont.	cont.			47,588	112	Early release	98%	Deschutes				
1981	1982	489,965	48			Healthy	100%	Deschutes	51047	50,717		
1982	1983	520,800	70			Healthy	100%	Grovers Creek	51347	45,284		
1983	1984	594,000	71			Healthy	100%	Grovers Creek	211622	52,373		
1984	1985	606,500	60			Healthy	100%	Grovers Creek	211657	51,518		
1985	1986	637,032	61.9			Healthy	100%	Grovers Creek		212,032		
1986	1987	547,353	69			Healthy	100%	Grovers Creek	51047			
1987	1988	531,351	65			Healthy	100%	Grovers Creek				
1988	1989			380,239	117	B.G.D.	85%	Grovers Creek	213137	124,626	3,065	252,548
1989	1990	501,391	55			B.G.D.	85%	Grovers Creek	211831	187,639	12,617	301,135
1990	1991	580,288	45			Healthy	100%	Grovers Creek	212014	193,496	8,695	378,097
1991	1992	509,815	48			Healthy	100%	Grovers Creek	212217	174,948	30,874	303,993
1992	1993	493,457	3			Healthy	100%	Grovers Creek	212326	186,072	14,070	293,315
1993	1994	268,873	45.7			B.G.D.	95%	Grovers Creek	212329	203,168	8,908	56,797
1994	1995	492,967	67			Healthy	100%	Grovers Creek	N.M.F.genitic experiment w/ 100 different CWT #'s			
1995	1996	563,320	57			Healthy	100%	Grovers Creek	212947	201,187	12,842	349,291
1996	1997	590,949	64.5			Healthy	100%	Grovers Creek	212963	201,607	8,182	381,160
1997	1998	508,565	37.9			Healthy	100%	Grovers Creek	213157	186,611	23,065	298,889
1998	1999			643,412	1100	Unfed/Excess	Extremely low	Grovers Creek	not tagged			

1998	1999	579,481	49.5			Healthy	!00%	Grovers Creek	213154			
1999	2000	339,101		339,101	271	Fed/Excess	69%	Grovers Creek	(Chinook fry were put in a seapen and morts were monitored)			
cont.	2000	519,595	56			Cwt w/ Ad Clip	100%	Grovers Creek	210153	200,589		
cont.	cont.					CWT no AD Clip		Grovers Creek	210169	199,267	119,739	

Gorst Creek Releases:

Brood Yr.	Release Yr.	Smolts	Size	Yearlings	Size	Notes at Release	Stock	Marks	Expected Survival to Seawater
1981	1982	52,391	70			Healthy	Deshutes		100%
1982	1983	80,000	80			High Stream Flows	Grovers		100%
1983	1984	690,000	85			Healthy	Grovers		100%
1984	1985	950,000	86			Healthy	Grovers		100%
1985	1986	970,000	67			Healthy	Garrison Springs		100%
1986	1987	500,000	90			High Flow killed 600,000	Grovers		100%
1987	1988	400,000	60			Healthy	Big Soos		100%
cont. 1987	1988	700,000	60			Healthy	Grovers		100%
cont. 1987	1988	1,220,000	77			Healthy	Grovers		100%
1988	1989	1,111,586	103			Healthy	Chambers/Grovers/Green		100%
cont. 1988	1989	1,107,800	82			Healthy	Grovers		100%
1989	1990	1,079,015	76			Healthy	Green River		100%
cont.1989	1990	1,271,505	77			Healthy	Deshutes		100%
1990	1991	1,241,457	79			Healthy	Grovers		100%
cont. 1990	1991	997,204	67			Healthy	Green River		100%
1991	1992	100,000	68			Storm killed 900,000	Minter Creek		100%
cont. 1991	1992	100,000	103			Storm killed 700,000	Minter Creek		100%
1992	1993	1,068,313	70			Healthy	Minter Creek		100%
cont. 1992	1993	513,799	86			Healthy	Minter Creek		100%
1993	1994	401,609	48			Healthy	Minter Creek		100%
1994	1995	650,090	72			Healthy	Grovers		100%
cont. 1994	1995	1,117,823	55			Healthy	Minter Creek		100%
1995	1996	1,103,916	74			Healthy	Grovers		100%

cont. 1995	1996	604,172	61			Healthy	Grovers		100%
cont. 1995	1997			81,140	7	Healthy	George Adams (Purdy)		100%
1996	1997	822,535	76			Healthy	Grovers		100%
cont. 1996	1997	1,009,498	65			Healthy	Grovers		100%
cont. 1996	1998			125,682	9	Furunculosis/ B.G.D.	Grovers	636354/AD	85%
1997	1998	950,860	57			Healthy	Grovers		100%
cont 1997	1998	897,331	49			Healthy	Grovers		100%
cont. 1997	1999			145,458	6	Furunculosis	Grovers	630405/06/AD	85%
1998	1999	997,235	87			Healthy	Minter Creek		100%
									Expected Survival to Seawater
cont. 1998	1999	998,067	74			Healthy	Minter Creek		100%
cont.1998	2000			48,494	6.6	Healthy	Grovers		100%
cont.1998	2000			47,515	5.5	Healthy	Grovers	AD CLIP	100%
1999	2000	941,442	92			Healthy	Grovers		100%
cont. 1999	2000	1,214,953	80			Healthy	Grovers		100%

Dogfish Creek Releases:

Brood Yr.	**Release Yr.**	**Fry Release**	**Size**	**Sub Yearling**	**Size**	**Notes @ Release**	**Stock**	**Expected Survival to Seawater**	**CWT or Marks**
1985	1986	299,922	87			Healthy	Grovers	100%	
1986	1987	206,431	83			Healthy	Grovers	100%	
1987	1988	24,700	89			Healthy	Grovers	100%	
1988	1989	257,850	90			Healthy	Grovers	100%	
1989	1990	200,601	73			Healthy	Grovers	100%	
1990	1991	269,845	56			B.G.D.	Grovers	85%	
1991	1992	103,354	65			Healthy	Grovers	100%	
1992	1993	70,373	96			Healthy	Minter Creek	100%	
1993	1994	Coho due to	low #s of	female chinook					

1994	1995	144,595	104			E.G.D.	Grovers	99%	
1995	1996	182,686	75			Healthy	Grovers	100%	
1996	1997	152,498	72			Healthy	Grovers	100%	
1997	1998	140,028	68.9			Healthy	Grovers	100%	
1997	1998			30,937	18	"ICH"	Grovers	85%	630439/AD
1998	1999	163,856	81			Healthy	Grovers	100%	
cont.	1999			50,262	24.7	Healthy	Grovers	100%	AD Clip
1999	2000	165,287	66			Healthy	Grovers	100%	
cont.	2000			50,000	40	Healthy	Grovers	100%	AD Clip

Clear Creek Releases:

Brood Yr.	**Release Yr.**	**Smolts**	**Size**	**Notes @ Release**	**Stock**	**Expected Survival to Seawater**
1987	1988	50000	46	Healthy	Grovers	100%
1988	1989	52866	40	Healthy	Grovers	100%
1989	1990	49817	72	Healthy	Green River	100%
1990	1991	52816	50	Healthy	Grovers	100%
1991	1992	49524	59.3	Healthy	Minter Creek	100%
1992	1993	26607	80	Healthy	Minter Creek	100%
1993	1994	Released coho due to low #'s of female chinook				
1994	1995	57965	90	Healthy	Grovers	100%
1995	1996	51870	96	B.G.D	Grovers	95%
1996	1997	49956	75	Healthy	Grovers	100%
1997	1998	50271	52.5	B.G.D	Grovers	95%
1998	1999	55354	60	Healthy	Grovers	100%
1999	2000	55296	83	B.G.D	Grovers	95%

10.4) Actual dates of release and description of release protocols. See above tables. All Grovers Creek fall chinook are targeted to between 65 to 45 fish/lb for release volitionally then forced. No culling is applied.

10.5) Fish transportation procedures, if applicable. Fish are reared on station for volitional release to avoid handling stress during release.

10.6) Acclimation procedures. Not applicable.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults. Grovers Creek have been CWTed since 1981, see Section 10.3 above.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels. No fish are surplus at time of release. Fed fry early in the program that are surplus to program goals are released into ponds with no outlets.

10.9) Fish health certification procedures applied pre-release.
Monthly fish health monitoring exams, as described in section **9.2.7**, are conducted by a fish pathologist from the Northwest Indian Fisheries Commission up until the time of release. Fish are usually examined within 2 weeks of their scheduled release. The exam includes an assessment of mortality rate, fish behavior, general condition of the fish, and rearing conditions. A necropsy is performed on representative fish from the population, including moribund and dead fish if these are available. An attempt is made to determine factors contributing to mortality. Parasites are routinely screened for by microscopic examination of gills and skin scrapes. Bacterial or viral assays may be conducted at the discretion of the pathologist if there is evidence of an infectious disease problem. Depending upon the findings of the exam, a recommendation will be made to either release the fish as planned, or if necessary, to take appropriate management actions prior to release.

10.10) Emergency release procedures in response to flooding or water system failure.
Record the number estimated released, estimated size, and estimated contribution (none, low, moderate, normal).

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases. Not applicable.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.
A. The number of adult hatchery chinook are counted and CWT's are recovered. The %

fertilization is electronically counted after dead eggs are removed at eye-up. The % eyed egg to smolt survival is calculated by subtracting all mortalities accrued since swimup.
B. Hatchery staff will continue to recover CWT's to identify the origin of each fish. Management staff will collect CWT's from terminal Tribal fisheries and on the spawning grounds to identify the origin of each fish. WDFW recovers CWT's from sport and commercial fisheries to identify the origin of each fish.
C. CWT's are collected on the spawning ground and, in the future, the presence/absence of adipose fins will determine in NOR's occur in the individual streams.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program. The present level of funding allows CWT processing and hatchery brood population statistics (age, size, etc.) to be collected. Funding will be necessary to mass mark the Grovers Creek Hatchery fish and modify facilities to accommodate mass markings. Funding will be necessary for biological personnel to carry out hatchery research activities necessary to identify if NOR's are present in the future, and to what, if any, there are NOR/HOR interactions, and if interactions occur, to what extent are the risks/benefits helpful/harmful to recovery of listed species.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities. Not applicable until funding is obtained to evaluate the presence or absence of listed species in East Kitsap marine waters or the presence of NOR's in East Kitsap freshwater. Research will result in the handling of salmon which may include the presence, and handling, of listed species.

SECTION 12. RESEARCH

12.1) Objective or purpose. The Suquamish Tribe will propose research projects to identify if listed species and/or NOR's are present in East Kitsap streams and marine waters, the interaction of HOR's, if any, with the listed species and/or NOR's.

12.2) Cooperating and funding agencies.

12.3) Principle investigator or project supervisor and staff.

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

12.6) Dates or time period in which research activity occurs.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

12.8) Expected type and effects of take and potential for injury or mortality.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

12.10) Alternative methods to achieve project objectives.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

SECTION 13. ATTACHMENTS AND CITATIONS

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____